Selected Abstracts from the September Issue of the European Journal of Vascular and Endovascular Surgery

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Activation of the Proapoptotic Unfolded Protein Response in Plaques of the Human Carotid Artery

Dorweiler B., Grechowa I., Wallrath A., Vahl C.F., Horke S. Eur J Vasc Endovasc Surg 2014;48:250-9.

Objective: To analyze expression of keystone markers of apoptosis and the proapoptotic signaling pathway "unfolded protein response" (UPR) in rupture-prone plaques of the human carotid artery.

Methods: Plaque specimens were obtained during endarterectomy for high-grade carotid stenosis, and were formalin-fixed. Ten specimens were identified that exhibited criteria of advanced rupture-prone atherosclerotic plaques, and histological and immunohistological analysis of markers of apoptosis (cleaved Caspase-3, TUNEL) and UPR (KDEL, ATF3, CHOP, CHAC-1) was performed. In addition, co-localization of apoptosis and UPR-activation was assessed by double-immunohistochemistry.

Results: The mean size of the necrotic core was 44 ± 7% and the mean minimum/representative thicknesses of the fibrous cap were 129 ± 39 μm/280 ± 60 μm, respectively. Each specimen fulfilled at least two of the criteria for rupture-prone plaques. Semi-quantitative analysis of immunohistochemistry showed a significant increase in cleaved Caspase-3-positive (1923 ± 93 cells/mm^2) and TUNEL-positive cells (1387 ± 66 cells/mm^2) when compared with control tissue. Furthermore, expression of UPR-markers KDEL, AFT3 and CHOP was significantly increased (1175 ± 40 cells/mm^2, 1971 ± 69 cells/mm^2 and 2173 ± 120 cells/mm^2, respectively). Co-localization of UPR-activation with apoptosis was confirmed by double-immunohistochemistry, and lesional macrophages were identified as the primary cell-type involved.

Conclusion: For the first time, activation of the proapoptotic signaling pathway UPR has been identified in advanced rupture-prone plaques of the human carotid artery. This provides additional evidence for adding UPR to the potential targets for controlling plaque apoptosis and thereby preventing plaque progression/rupture.

Temporary Aneurysm Sac Perfusion as an Adjunct for Prevention of Spinal Cord Ischemia After Branched Endovascular Repair of Thoracoabdominal Aneurysms

Kasprzak P.M., Gallis K., Cucuruz B., Pfister K., Janotta M., Kopp R. Eur J Vasc Endovasc Surg 2014;48:260-7.

Objective: To report experience with the concept of temporary aneurysm sac perfusion (TASP) and second stage side branch completion to prevent severe spinal cord ischemia (SCI) after branched endovascular aortic repair (bEVAR) for thoracoabdominal aortic aneurysm (TAAA).

Methods: Patients were treated for TAAA with bEVAR between January 2009 and September 2012. TASP was performed by non-completion of side branches to one of the reno-visceral arteries, distal aortic or iliac extensions with secondary side branch completion. Primary endpoints of the study were overall technical success, side branch patency, perioperative mortality, and the rate of severe SCI.

Results: Eighty-three patients were treated for TAAA with branched aortic stent grafts with ($n = 40$) or without ($n = 43$) TASP. Overall technical success, including aneurysm exclusion, absence of persistent type I or III endoleak, TASP side branch patency, and secondary side branch completion was 35/40 (88%). Secondary TASP side branch completion was performed after a median of 48 days (range 1 −370 days). The rate of early re-interventions for reno-visceral side branch complications was 8/283 (3%) and 6/83 (7%) for perioperative mortality, with three patients in both groups. Severe SCI or paraplegia was observed in 11/83 (13%) of the patients and reduced in the TASP group (2/40) compared with the non-TASP group (9/43; $p = .03$), especially in Crawford I −III aneurysms (1/29 vs. 7/24; $p = .01$). However, one TASP patient died 4 months after bEVAR during the TASP interval from suspected aorto-bronchial fistula.

Conclusion: The concept of TASP after bEVAR for TAAA is feasible and seems to reduce the risk of SCI. Early side TASP branch completion within 4 weeks is recommended to reduce the risk of rupture, although, according to the individual clinical presentation, a longer TASP interval might improve neurological rehabilitation from SCI.

Endovascular Repair of Acute Uncomplicated Aortic Type B Dissection Promotes Aortic Remodelling: 1 Year Results of the ADSORB Trial

Brunkwall J., Kasprzak P., Verhoeven E., Heijmen R., Taylor P., the ADSORB Trialists, Alric P., Canaud L., Janotta M., Raithel D., Malina M., Resch Ti., Eckstein H.-H., Ockert S., Larzon T., Carlsson F., Schumacher H., Classen S., Schaub P., Lammer J., Lönn L., Clough R.E., Rampoldi V., Trimarchi S., Fabiani J.-N., Böckler D., Kotelis D., Böckler D., Kotelis D., von Tenng-Kobligk H., Mangialardi N., Ronchey S., Dialetto G., Matoussevitch V. Eur J Vasc Endovasc Surg 2014;48:287-93.

Objectives: Uncomplicated acute type B aortic dissection (AD) treated conservatively has a 10% 30-day mortality and up to 25% need intervention within 4 years. In complicated AD, stent grafts have been encouraging. The aim of the present prospective randomised trial was to compare best medical treatment (BMT) with BMT and Gore TAG stent graft in patients with uncomplicated AD. The primary endpoint was a combination of incomplete/no false lumen thrombosis, aortic dilatation, or aortic rupture at 1 year.

Methods: The AD history had to be less than 14 days, and exclusion criteria were rupture, impending rupture, malperfusion. Of the 61 patients randomised, 80% were DeBakey type IIIB.

Results: Thirty-one patients were randomised to the BMT group and 30 to the BMT+TAG group. Mean age was 63 years for both groups. The left subclavian artery was completely covered in 47% and in part in 17% of the cases. During the first 30 days, no deaths occurred in either group, but there were three crossovers from the BMT to the BMT+TAG group, all due to progression of disease within 1 week. There were two withdrawals from the BMT+TAG group. At the 1-year follow up there had been another two failures in the BMT group: one malperfusion and one aneurysm formation ($p = .056$ for all). One death occurred in the BMT+TAG group. For the overall endpoint BMT+TAG was significantly different from BMT only ($p < .001$). Incomplete false lumen thrombosis, was found in 13 (43%) of the TAG+BMT group and 30 (97%) of the BMT group ($p < .001$). The false lumen reduced in size in the BMT+TAG group ($p < .001$) whereas in the BMT group it increased. The true lumen increased in the BMT+TAG ($p < .001$) whereas in the BMT group it remained unchanged. The overall transverse diameter was the same at the beginning and after 1 year in the BMT group (42.1 mm), but in the BMT+TAG it decreased (38.8 mm; $p = .062$).

Conclusions: Uncomplicated AD can be safely treated with the Gore TAG device. Remodelling with thrombosis of the false lumen and reduction of its diameter is induced by the stent graft, but long term results are needed.

In Situ Reconstruction in Native and Prosthetic Aortic Infections Using Cryopreserved Arterial Allografts

Touma J., Cochennec F., Parisot J., Fialaire Legendre A., Becquemin J.-P., Desgranges P. Eur J Vasc Endovasc Surg 2014;48:294-301.

Objectives: To evaluate overall survival and complications of cryopreserved arterial allografts in aortic graft infections and infected aortic aneurysms.

Results: During the study period, 54 patients (45 [83%] men, mean age 66.2 ± 10.2 years) underwent aortic reconstruction using cryopreserved allografts. Indications were native aortic infection in 17 patients and prosthetic graft infection in 37 patients, including seven aortoenteric fistulae. Twelve aortic reconstructions (22%) were performed as emergency procedures. The median duration of follow-up was 12.1 months (range 0.4−83.6). The 30-day mortality rate was 28%. The overall mortality rate